TERTIARY MARSUPIALS FROM VICTORIA, AUSTRALIA.

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Text-figures 1-6.

Introduction.

Three localities in Victoria have yielded mammalian fossils of Tertiary age, and a fourth a fossil of possible Tertiary age. These specimens have been referred to in literature, but there is no detailed description of their characters. Though only one new name is proposed at this time, the specimens are illustrated and described for future reference.

One of these from near Ballarat is described as a new genus and new species. It is apparent that two other new genera are represented here under the heading Diprotodontidae and in all probability generic characters will be discernible in them even when other closely related genera have been described. But in introducing generic names the binomial system must be used, and it is doubtful if characters on the specific level can ever be recognized in these specimens except possibly in Nos. P.15910 and P.15909 from Beaumaris. Furthermore this procedure seems appropriate since it is doubtful whether more diagnostic materials representing these forms will be found in the localities from which they came, and if they are discovered, new names with adequate descriptions can be made at that time. Therefore to avoid confusion for taxonomists and stratigraphers in the future I have not applied the binomial system of nomenclature to these interesting fossils.

Mr. R. T. M. Pescott, Director, and Mr. Edmund D. Gill, Curator of Fossils, National Museum of Victoria, kindly loaned the specimens to the author for study. Assistance in making available comparative materials was given by Mr. Harold O. Fletcher, Curator of Fossils, and by Mr. Ellis Troughton, Curator of Mammals, Australian Museum, Sydney. I am grateful to Mr. Hobart M. Van Deusen, American Museum of Natural History for measurements of Recent specimens. The shaded illustrations were prepared by Mr. Owen J. Poe, staff artist of the Museum of Paleontology, University of California, while text-figures 6 and 3B were sketched by the author. A Fulbright Award in 1953 made this study possible.

Fossil Podsol, Grange Burn, Near Hamilton.

PHALANGERIDAE.

Text-figure 1.

Text-fig. 1. PHALANGERIDAE, right upper molar, natural size; Nat. Mus. Vict., No. 15777; *hy*, hypocone; *me*, metacone; *pa*, paracone; *pr*, protocone. A. Labial view. B. Occlusal view.

Cuscus, Gill, 1953A, p. 409.
"*Cuscus* type", [1]Gill, 1953C, p. 107.
cf. *Cuscus,* Gill, 1955, pl. 1, figs. 1-4.

Mr. Edmund D. Gill discovered this upper molar in a fossil podsol under a basalt member where the Grange Burn flows off the basalt on to Tertiary rocks near Hamilton, Victoria. The site was 6 inches under the basalt and near a waterfall, 1 mile upstream from Forsyth's Bank. He referred it to the Upper Pliocene.

This is the crown of a moderately worn right molar without roots. Nat. Mus. Vict. reg. No. P.15777.

Paracone higher and larger than metacone (but measured from base of enamel this is not true); protocone and metacone so well worn commissures at labial base not observable; low but distinct crests extend from paracone and metacone down toward protocone and hypocone; tooth too much worn to show any indication of a crenulated surface; no cingula.

Measurements.	*Phalanger maculatus nudicaudatus.* Amer. Mus. Nat. Hist.				*Phalanger orientalis peninsulae.* Amer. Mus. Nat. Hist.				Hamilton Fossil.
	No. 153611 ♂		No. 153615 ♀		No. 154439 ♂		No. 154437 ♀		
	M^2.	M^3.	M^2.	M^3.	M^2.	M^3.	M^2.	M^3.	
Median length	5·8	5·7	6·3	6·3	1·8	4·5	4·8	4·8	8·2
Width across anterior moiety	4·9	4·7	5·4	4·9	4·1	4·0	4·4	4·1	7·8
Width across posterior moiety	4·5	4·1	4·5	4·3	3·5	3·3	3·6	3·4	6·5
Height of paracone from base of enamel	2·2	2·0	2·4	2·1	1·5	1·7	1·3	1·5	4·1
Height of metacone from base of enamel	2·0	1·7	2·1	1·9	1·5	1·5	1·3	1·5	4·3

The crown pattern is much like that in *Phalanger m. nudicaudatus* (Gould). if the fossil is an M^2 or M^3. It certainly is not M^4 because there is an appressed surface on the posterior edge indicating a tooth was behind it. It

(1)—In the citation "*Cuscus* type" and in other similar references in synonomy in this report, it should be borne in mind the author (Gill) was attempting to indicate that the specimen in question, though showing affinity with the genus named, was not necessarily referable to that genus.

does not appear to be M^1 because the appressed area in front is too wide for P^3. Furthermore, the anterior moiety is wider than the posterior moiety.

The main difference that I see between *Phalanger m. nudicaudatus* and *Phalanger o. peninsulae* Tate and the fossil is in the size of the tooth. It is approximately twice the size of these living species. Also, the teeth seem to be relatively more elongate in the Recent forms, and there is a prominent median lingual inflection in the fossil. If more teeth were represented of this animal, other conspicuous differences should appear.

Marine Beds at Forsyth's Bank, Grange Burn, Hamilton.

STHENURINAE.

Text-figure 2.

Wallaby (*Halmaturus?*), Colliver, 1933, p. 71.

"*Macropus* in the wide sense", Gill, 1953A, p. 409.

"*Macropus* type", (2)Gill, 1953C, p. 107.

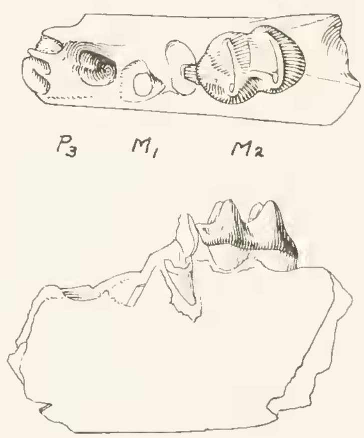
cf. *Macropus,* Gill, 1955, pl. 1, figs. 5-8.

This specimen has been referred to the Lower Pliocene by Gill (1953A).

Part of left mandible with most of alveolus for P_3; roots of M_1 and fragment of tooth; well-preserved M_2; anterior edge of alveolus of M_3. University of Melbourne, Dept. Geol. reg. No. 2019.

Alveolus indicates P_3 larger than M_1 or M_2; M_1 smaller than M_2; no evidence for size of M_3; no evidence of position of mental foramen; M_2 rather elongate; narrow, median anterior shelf-like cingulum; low forelink extends to anterior cingulum from protoconid; protolophid sharp, slightly crescentic; median valley V-shaped; low midlink extends down to bottom of median valley from hypoconid; hypolophid sharp, slightly crescentic; posterior end of tooth with slight posterior extension at lower enamel border; no postlink; enamel surface not pitted or finely grooved.

A



B

Text-figure 2.

STHENURINAE, part of left mandible, natural size; Univ. Melbourne Dept. Geol., No. 2019. A. Occlusal view. B. Labial view.

The Forsyth's Bank specimen is referable to the subfamily Sthenurinae in all of the characters of its M_2. The described species referable to that subfamily

(2)—See footnote 1.

are *Sthenurus atlas* (Owen, 1873; 1874) from the Wellington Cave (genotypic species), *S. pales* DeVis (1895) and "*Sthenurus*" *oreas* DeVis (1895) from the Darling Downs region, and "S." *occidentalis* Glauert (1910) from the Mammoth Caves of Western Australia. The Victorian specimen is probably more distantly related to the much smaller "*Halmaturus*" *vishnu* DeVis (1895) and "*Halmaturus*" *odin* DeVis (1895) from the Darling Downs region which also have *Sthenurus*-like molars but narrow rather trenchant premolars. The alveolus for the premolar in the Forsyth's Bank animal appears to have been too large and bulky for either *vishnu* or *odin*, and is more suggestive of those in the species listed above. The generic and specific relationships of the specimen at hand cannot be determined until a premolar is found. Unfortunately neither the stratigraphic position nor the exact geographic location of the types mentioned above from the Darling Downs region have been established.

Measurements.	*Sthenurus atlas* (topotype).	"*Sthenurus*" *oreas* (type).	"*Sthenurus*" *occidentalis* (topotype).	Sthenurinae Forsyth's Bank.	"*Halmaturus*" *vishnu* (type).	"*Halmaturus*" *odin* (type).
Length of P_3	16·8	17·6	16·2	11·2 approx.	9·8	9·3
Length of M_1	10·8	12·4	10·3	9·7 approx.	7·2	7·4
Length of M_2	11·9	15·1	12·3	11·1	7·9	9·5
Width of M_2 across protolophid	10·5	12·3	10·1	8·2	6·7	7·5
Width of M_2 across hypolophid	..	..	10·2	8·2	..	..
Depth of mandible below anterior edge of M_1 ..	31·0	..	32·2	20·4	18·3	25·5
Height of protoconid on M_2	8·3	..	7·1	5·8	4·1	..
Height of hypoconid on M_2	9·6	..	7·3	6·3	5·0	..

Marine Sandringham Sands, Beaumaris.

Three diprotodont (Diprotodontidae) specimens were picked up on the tide swept shore platform at Beaumaris. Two of these (M.U.G.D.2020 and P.15909) probably belong to the same species, and to a group frequently called " nototheres ", though they are not closely related to the genus *Nototherium* Owen of about the same size. The other (P.15911), described on page 127 in this report, is much more primitive and smaller. The preservation and fluorine tests of these specimens indicate that they come from the contiguous cliffs of the Sandringham Sands formation (Gill, 1950, 1953c, 1957), which constitute the type section of the " Cheltenhamian " Stage (Singleton, 1941).

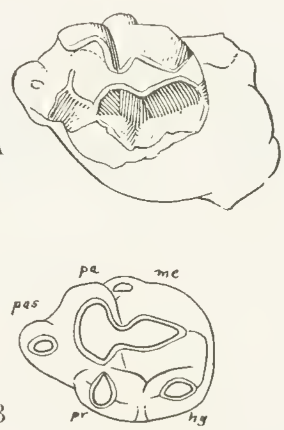
DIPROTODONTIDAE.

Text-figures 3, 4.

Specimen M.U.G.D. reg. No. 2020 P^3.
Palorchestes, Hall and Pritchard, 1897, p. 58.
Palorchestes, Cudmore, 1926, pp. 81-82.
Palorchestes, Colliver, 1933, p. 71.
" *Palorchestes* type ",[3] Gill, 1953c, p. 107.
Diprotodont, Stirton, 1954a.
Specimen P.15909, part of right maxillary. Also fragment P.15910.
" *Nototherium* type ",[4] Gill, 1953c, p. 107.
Diprotodont, Stirton, 1954a.

The P^3, M.U.G.D. reg. No. 2020, though with the same preservation as P.15909, is badly abraded. Nevertheless I think its cusp arrangement can be determined (see Text-figure 3B).

A



B

Text-figure 3.

DIPROTODONTIDAE (size, medium), left P^3, natural size; M.U.G.D. reg. No. 2020, *hy*, hypocone; *me*, metacone; *pa*, paracone; *pas*, parastyle; *pr*, protocone. A. Occlusal view. B. Restoration of occlusal view.

(3)—See footnote 1. (4)—See footnote 1.

Protocone, hypocone, paracone, metacone, and parastyle all well developed; paracone largest, not widely separated from metacone; parastyle at anterior angle of tooth; low stylar cusp in middle of labial side; basin between protocone, hypocone, and metacone; enamel surface smooth; hypocone and metacone connected posteriorly by low crest; outline of lingual and labial borders convex.

This is much like a P^3 described by Glauert from the Mammoth Caves in Western Australia. It is also similar to "*Nototherium*" *tasmanicum* Scott, but differs in details from both.

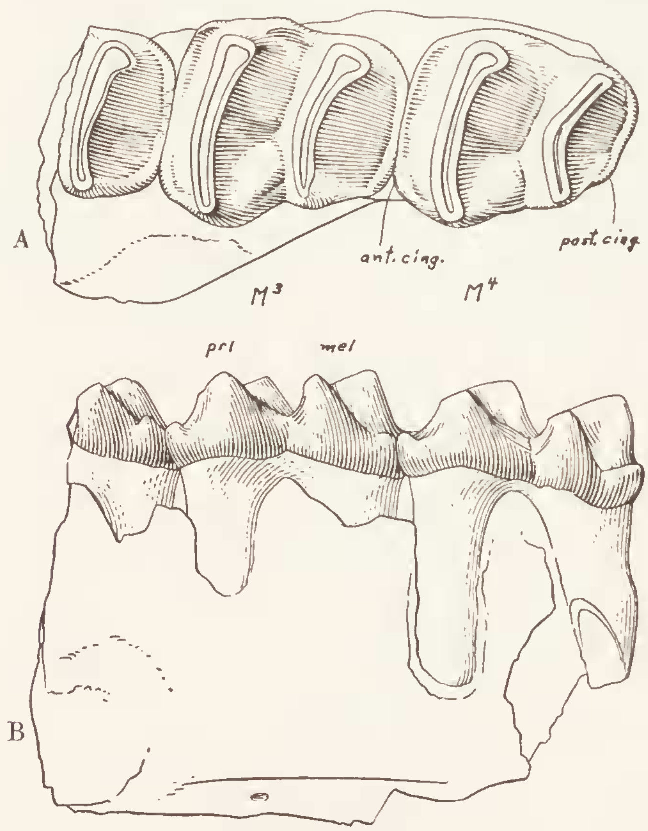
Part of right maxillary with posterior moiety of M^2 but with M^3 and M^4 complete may offer some useful information once additional data are available on other forms.

P.15909.

Teeth well preserved, slightly worn; bone abraded; jugal process M^2 and anterior moiety of M^3, low rounded ridge extends posteriorly from this process parallel to and 30 mm. above tooth row.

Measurements—

Median length	28·9 mm.
Width across middle	18·1 mm.



Text-figure 4.

DIPROTODONTIDAE (size, medium), part of right maxillary; natural size; Nat. Mus. Vict., No. 15909; *ant. cing.*, anterior cingulum; *mel*, metaloph; *post. cing.*, posterior cingulum; *prl*, protoloph. A. Occlusal view. B. Labial view.

M^2 with metaloph nearly transverse, only slightly crescentic; posterior cingulum continuous across posterior end of tooth, terminates at posterior base of metacone and at posterolingual base of hypocone, stylar cusp at posterolingual base of hypocone, stylar cusp at posterolabial corner; evidently short cingulum across lingual opening of median valley.

M^3 with anterior moiety wider than posterior moiety; protoloph transverse but slightly crescentic and slightly oblique; wide anterior cingulum not elevated at midpoint, terminates in stylar cusp at anterolabial corner of tooth, anterior cingulum as wide as protoloph, terminates lingually at anterior base of protocone: posterior cingulum not as wide as metaloph, smaller stylar cusp at posterolabial corner, not elevated at midpoint, terminates lingually at posterior base of hypocone; cingulum not continuous opposite protocone, hypocone, paracone, or metacone; short cingulum across lingual opening of median valley with small stylar cusp at posterolingual base of protocone; median valley wide; faint elevation of midlink like structure in median valley back of paracone; no stylar cusp at posterolabial base of paracone.

M^4 like M^3 but metaloph more crescentic and posterior moiety relatively and actually narrower.

Measurements—

Length M^3 to M^4	56·6 mm.
Length M^3	28·0 mm.
Length M^4	28·0 mm.
Width metaloph M^2	20·9 mm.
Width protoloph M^3	25·4 mm.
Width metaloph M^3	21·6 mm.
Width protoloph M^4	23·8 mm.
Width metaloph M^4	18·5 mm.
Height paracone M^3	12·0 mm.
Height paracone M^4	11·2 mm.

Comparison of the Beaumaris maxillary with part of a large diprotodont maxillary from the Palankarinna fauna discloses a marked resemblance. The Beaumaris form differs in the following features from the Palankarinna specimen; posterior moieties relatively narrower transversely; anterior cingula with labial cusp less developed but distinct; no stylar cusp at posterior labial base of paracone; posterior edge of jugal arch apparently opposite anterior edge of M^3.

This specimen seems to be closely related but less advanced than a larger "nothothere" (Stirton, 1954B, p. 1308) from Palankarinna. Unfortunately adequate types for these fossils are not yet available.

Specimen P.15911.

Text-figure 5.

Sthenurus (?), Cudmore, 1926, pp. 81-82.

"*Sthenurus* type",[5]. Gill, 1953C, p. 107.

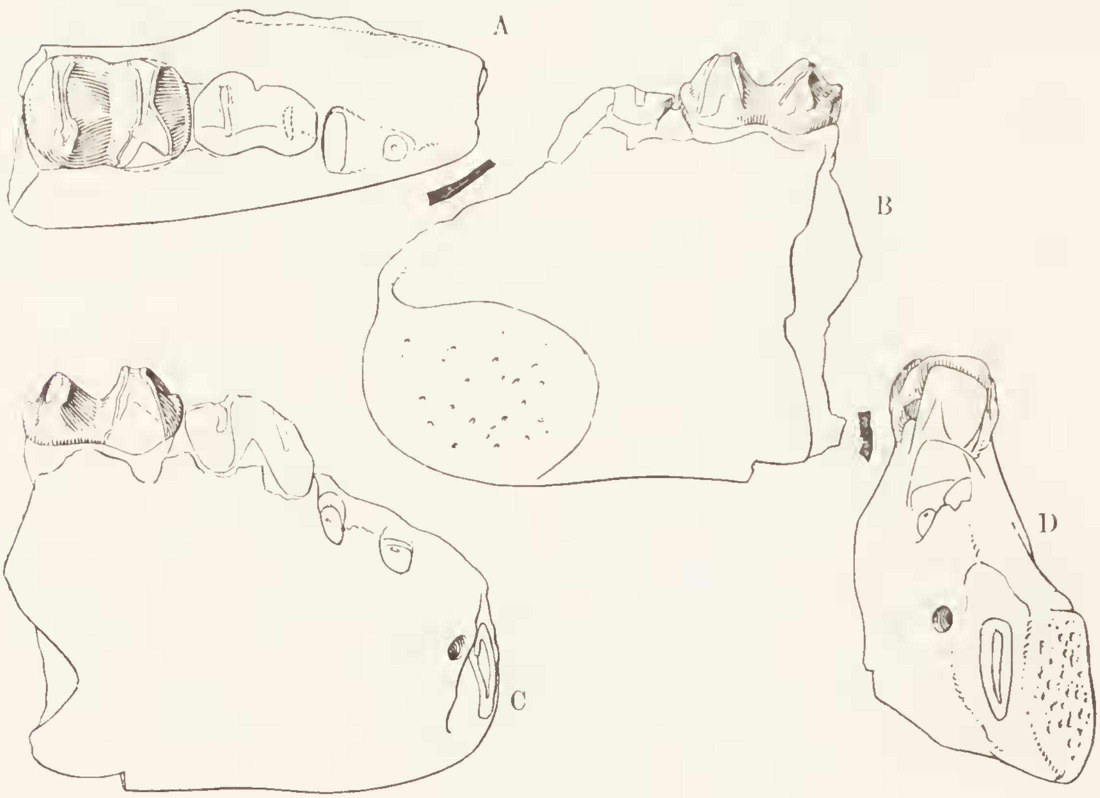
? diprotodont, Stirton, 1954A.

This specimen unquestionably represents a new genus and probably a new subfamily. It is the anterior part of a heavily abraded right mandible with part of the symphysial surface. A cross-section of the root of the incisor is observable. Part of the lower ends of the two roots of P_3 and only some of

(5)—See footnote 1.

the dentine is remaining of M_1. M_2 is fairly well preserved but the enamel is missing on the labial base of the crown and also on the labial side of the protolophid.

Posterior edge of symphysis below anterior end of M_1; P_3 two rooted; M_2 elongate, relatively narrow for any known genus in the Diprotodontidae; protolophid possibly slightly wider than hypolophid; lophids transverse and slightly crescentic; posterior cingulum relatively short, does not curve anteriorly towards base of hypoconid, elevated at midpoint, without midpoint spur connecting to base of hypolophid; anterior cingulum also short, tapers down to labial corner; slight midlink extending out from hypoconid; no forelink or hindlink; apparently no short cingula across mouths of median valley; wide median valley; base of incisor flattened laterally; small round mental foramen 16 mm. below and 5 mm. in front of P_3.



Text-figure 5.

DIPROTODONTIDAE (size, small), anterior end of heavily abraded mandible, natural size; Nat. Mus. Vict., No. P.15911. A. Occlusal view. B. Lingual view. C. Labial view. D. Front view.

There is another left mandible in the National Museum of Victoria (P.16279) from Chinchilla, Queensland. The Chinchilla specimen has P_3, M_1, M_2, and M_4 in place. P_3 is badly broken on the upper lingual surface but from the median crest there is a gently sloping labial surface and the basal cingulum which seems to be continuous around the tooth is quite distinct. The outline of P_3 is ovate but wider in its posterior half. The lower molars agree with those in *Meniscolophus* (Stirton, 1954c) in an elevation of the posterior cingulum at the midpoint but there is no spur-like connexion across to the base of the hypolophid as occurs in the Palankarinna form. Of course the molars are much smaller, lower crowned, more elongate and they differ from all known diprotodonts in many other features. The Chinchilla form has a forelink on M_1 which may be diagnostic in this undescribed genus. The forelink is not present on the other molars. Nevertheless the massive mandible and the construction of the molars is more like the Diprotodontidae than like the Macropodidae. It is not referable to any other known family of marsupials.

Measurements—

Depth of mandible below M_2	42·7 mm.
Thickness of mandible below M_2 ..	22·9 mm.
Approximate length P_3	13·5 mm.
Apparent length M_1	15·2 mm.
Approximate width M_1	10·4 mm.
Length M_2	19·5 mm.
Width across hypolophid M_2	13·0 mm.
Approximate height of hypoconid M_2 ..	8·2 mm.

Well, Parish of Smeaton, Near Ballarat.

The mandible of a dasyurid with M_4 and the posterior root of M_1 in place was presented to the National Museum of Victoria, in 1914, by Mr. J. Marshall. Recently Mr. Edmund D. Gill found the first molar (M_1) which fits into the alveolus and contacts perfectly with the broken root in the posterior alveolus.

Though the geologic age of the specimen is not certainly known at this time, it seems that its stratigraphic position in the section at the Parish of Smeaton, can be established (see Gill, 1957). The characters in this young mandible offer additional information on the relationships of *Dasyurus*, *Dasyurops* and *Sarcophilus*.

Glaucodon[6] *ballaratensis* Stirton, n. gen. and n. sp.

Text-figure 6.

Sarcophilus? Gill, 1953B, p. 87.

Type of genotypic species.—Glaucodon ballaratensis.

The diagnostic characters of the genus are those of the genotypic species until other species are described.

Holotype.—Right mandible with ascending ramus and part of angle missing; alveoli for three incisors, canine, two premolars and for the second and third molars; M_1 and M_4 in place. Premineralization by vivianite displaying dark-blueish colour particularly in the teeth. Animal evidently young adult. Nat. Mus. Vict. reg. No. P. 16136.

Type locality.—Taken from a depth of 50 feet in allotment 42, Parish of Smeaton, near Ballarat (for additional information see Gill 1957 of this memoir).

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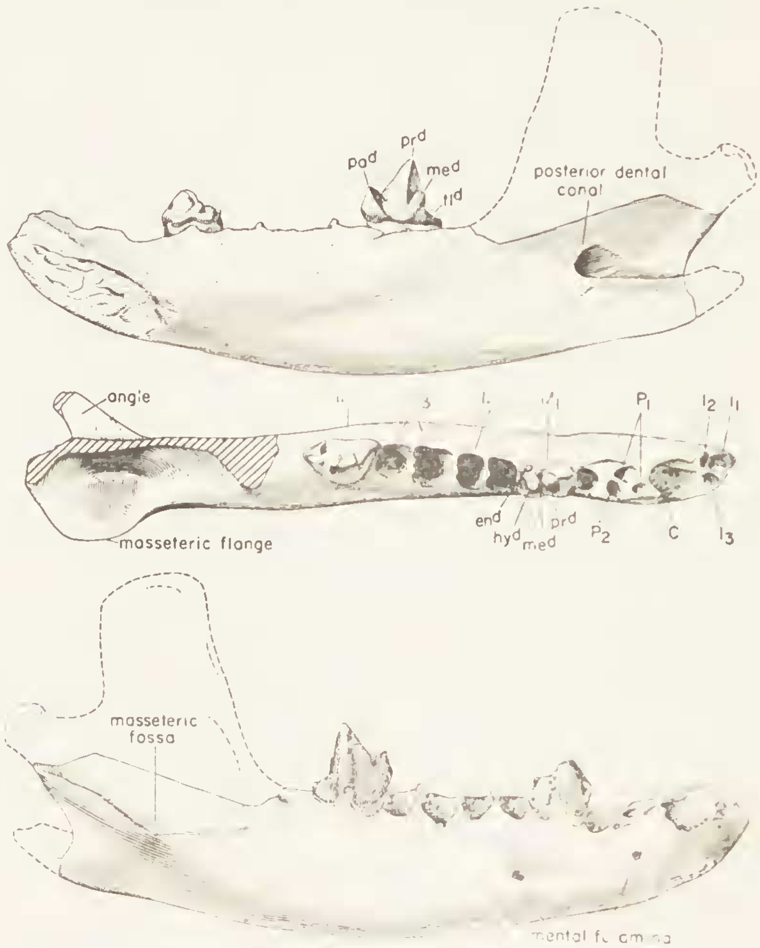
(6)—λγαυκός, blue; ὀδοών, tooth. Colour in type specimen.

Diagnosis and Description.—Teeth larger but length of mandible only slightly longer than in *Dasyurops maculatus* (Kerr); alveoli of incisors crowded out of line, middle one above others, inner and middle ones equal (2·1 mm. dorsoventrally), outer one about 0·1 smaller, labial edges of incisor alveoli convex, inner edges straight or slightly concave; canine alveolus large, labial edge convex, inner edge slightly concave; alveoli for premolars crowded, no



Text-figure 6.

Glaucodon ballaratensis Stirton, n. gen. and n. sp., right mandible, natural size; Nat. Mus. Vict., No. P. 16136; *en*^d, entoconid; *hy*^d, hypoconid; *me*^d, metaconid; *pa*^d, paraconid; *pr*^d, protoconid; *tl*^d, talonid. A. Lingual view. B. Occlusal view. C. Labial view.

diastems C and M_1; alveoli for P_1 [7] set oblique to anteroposterior axis of tooth row and P_2 alveoli slightly so, both teeth double rooted, alveoli for roots P_1 more posteriorly directed, those of P_2 more vertical and with posterior alveolus nearly twice as large as anterior one, alveoli indicate smaller gradation in size from M_3-M_1.

(7)—If we assume that the premolar reduction in *Dasyurops, Dasycercus,* and *Glaucodon* was the same as that in *Phascogale*, as indicated by its vestigial P_3, the remaining lower premolars in these genera are P_1 and P_2.

M_1 with heavy median protoconid, anterior median crest from base to top of protoconid, metaconid tightly appressed to posterolingual slope of protoconid, well developed talonid, hypoconid massive slightly crescentic, hypoconulid in posteromedian position at posterior end of hypoconid crescent, indication of tiny cusp of posterolabial crest of protoconid connecting across to hypoconid crescent in this stage of wear, entoconid as small rounded cusp, talonid basin with narrow lingual opening anterior and posterior to entoconid—no direct posterior opening; posterior lower labial corner extends farther posteriorly than other parts of the tooth. M_4 with high sharp paraconid-protoconid shear, protoconid much higher than paraconid, not separated by deep niche in blade, protoconid with slight backward direction, inner surface somewhat flattened with distinct vertical median ridge, metaconid much smaller than paraconid, talonid greatly reduced, small crescentic crest connecting hypoconid and entoconid, tiny posterolabial cingulum on talonid, basal cingulum on anterolabial surface. Small anterior mental foramen below anterior end of P_2, large posterior mental foramen below anterior end of M_3, opening of dental canal with 3·3 vertical diameter; lower end of masseteric fossa, angle and masseteric flange as in *Dasyurops*.

Comparison.—The characters in *Glaucodon ballaratensis* seem to indicate proximity of an intermediate relationship beween *Dasyurus quoll* (Zimmerman), the native cat, and *Dasyurops maculatus* (Kerr), the tiger cat, on the one hand and the undescribed *Sarcophilus* [8] from the Pliocene at Kalamurina from the Warburton River in South Australia on the other.

It differs from *Dasyurus* and *Dasyurops* and tends to approach the Kalamurina *Sarcophilus* in several features: alveoli of incisors crowded out of line, middle one above others, alveoli of premolars crowded, no diastems between C and M_1; alveoli for P_1 set oblique to anteroposterior axis of tooth row, and P_2 alveoli slightly so, posterior alveolus of P_2 nearly twice as large as anterior one; M_1 cusps more massive not so trenchant; M_4 with higher paraconid shear, protoconid and paraconid not separated by deep niche; protoconid with higher apex, apex with slightly stronger backward direction, and with distinct median-vertical-lingual ridge, metaconid smaller than paraconid but not vestigial; talonid greatly reduced, with less bicuspid aspect.

Glaucodon differs from the Kalamurina as well as the later species of *Sarcophilus* and tends to approach *Dasyurops,* particularly, in: proportions of horizontal ramus; shape of masseteric fossa, angle, and masseteric flange; more trenchant molars with longer and more distinctly bicuspid talonids; M_4 with paraconid shear relatively and actually lower. apex not so strongly directed posteriorly, inner surface somewhat flattened, median-vertical-lingual ridge on protoconid not as pronounced; metaconid still present not vestigial.

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(8)—The *Sarcophilus* from Kalamurina is more closely related to *S. laniarius* (Owen) from the Wellington Caves and elsewhere in Pleistocene assemblages than to the living *S. harrisii* Boitard.

Measurements.	*Dasyurus quoll* ♂ (U. C. Mus. Pal.).	*Dasyurops maculatus* No. 66162 ♂ (Amer. Mus. Nat. Hist.).	*Glaucodon ballaratensis* Genotype No. P16136 Nat. Mus. Vict.	Pliocene *Sarcophilus*.	*Sarcophilus laniarius* composite topotypes Nos. M 1261–64 (Aust. Mus.).	*Sarcophilus harrisii* No. 65670 ♂ (Amer. Mus. Nat. Hist.).
Length, anterior edge of incisor alveoli to posterior end of M_4	35·0	46·9	54·5	71·0	72·5	65·2
Length, molar series ..	20·0	25·3	34·6	44·2	49·4	41·4
Length between C and M_1 ..	8·7	13·2	10·3	11·1	13·8	10·7
Length M_4	5·3	6·6	10·0	12·8	15·0	10·7
Width of M_4	3·1	3·8	5·8	6·8	8·2	6·3
Height of protoconid of M_4 above edge of enamel of anterior root	5·2	6·4	9·1	12·4	15·2	9·8 (worn)
Depth of mandible below P_2, measured from tip of bone between roots	7·0	9·8	10·1	20·4	23·7	18·0
Depth of mandible below M_4, measured from tip of bone between roots	9·2	14·0	17·3	27·7	28·6	21·3
Thickness of mandible below M_4	4·0	6·1	6·7	11·2	12·5	10·1
Length M_1	4·5	4·9	7·6	9·2	10·6	..
Width M_1	2·7	2·9	4·2	6·1	7.1	..

Thylacynus cynocephalus (Harris) with its three premolars, absence of metaconid (as in *Sarcophilus*—evidently convergent characters), and shape of the angle seems to be rather widely removed in its relationships.

If *Glaucodon* was a dasyurid in the direct ancestry of the known species of *Sarcophilus*, judged by its stage in evolution, it could be as old as late Miocene or slightly older. If it is Pliocene or later it must represent a primitive form lingering on that shows some features of an early evolutionary stage in the group. The reduction in the size of the metaconid and of the talonid preclude its having given rise to any of the genera now known other than *Sarcophilus*. Perhaps these questions will be answered through future discoveries.

Summary.

Three localities in Victoria, Australia, have yielded five fragmentary marsupials of Tertiary age. A fourth locality near Ballarat has yielded a specimen of possible Tertiary age. A diprotodont (Diprotodontidae) of medium size and a smaller more primitive one occur in marine beds, near Beaumaris. These fossils were found on the tide-swept shore platform, but the preservation and fluorine tests indicate that they come from the contiguous cliffs which consist of beds of Upper Miocene age (Gill, 1953A, 1957). Part of a mandible with one tooth from Forsyth's Bank, Grange Burn, near Hamilton, is referable to the Macropodid subfamily Sthenurinae. It is much smaller than *Sthenurus atlas* Owen. The marine bed in which it was found, and to which it has been shown to belong by fluorine test is of Lower Pliocene age (Gill, 1953A, 1955, 1957). An upper molar of a cuscus from a fossil podsol near Hamilton, has been dated as Upper Pliocene. The tooth is nearly twice as large as in other Australian species. A dasyurid mandible from near Ballarat with one molar in place is described as *Glaucodon ballaratensis* Stirton, n. gen. and n. sp. Characters in the specimen suggest proximity to an intermediate relationship between *Dasyurops* and *Dasyurus* on the one hand and to the sarcophilenes on the other. The specimen is suggestive of a position leading toward *Sarcophilus*.

Characters in these fossil marsupials do not as yet confirm or offer evidence to question the ages assigned. This is due in part to our inadequate knowledge of the evolution in Australian marsupials. As our evidence increases, however, these records of land mammals in marine formations will be most helpful in establishing synchrony in the deposition of continental and marine stratigraphic units in Australasia.

Generic and specific names have not been applied, except in one specimen, because of incompleteness in the elements preserved and because of the confusion likely to ensue for taxonomists in the future.

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